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# WATER QUALITY MEMORANDUM Utah Coal Regulatory Program

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June 30, 2011

TO: Internal File

FROM: April A. Abate, Environmental Scientist III *AAA 6-30-2011*

THRU: James D. Smith, Permit Supervisor *JDS 06/30/11*

SUBJECT: 2010 4th Quarter Water Monitoring: Bear Canyon Mine, C/015/0025,  
Task ID # 3695

The monitoring plan is described on pages 7-48 through 7-60A of the MRP. It includes Tables 7-12 through 7-17. The mine is now operating under a permit held by Castle Valley Mining, LLC.

**1. Were data submitted for all of the MRP required sites?**

**In-mine**

YES ☒ NO ☐

A total of two active in-mine samples are listed in the Bear Canyon water monitoring plan: SBC-9A, 16-8-8-10. The Mohrland Portal, sample 16-8-8-10 and SBC-9A were sampled during the 4th quarter for operational parameters.

**Springs**

YES ☒ NO ☐

Most of the spring samples in and around the Bear Canyon mine are sampled for field, or either operational or baseline parameters. Active springs requiring operational parameter sampling during the months of February, May, August, and October include: SBC-4-Big Bear Springs, SBC-5-Birch Spring, SBC-17 (16-7-24-4). SBC-14 requires operational monitoring in May, August and October only. Currently active springs requiring field parameter only measurements during the months of May, August and October include: SBC-15, SBC-16, SBC-16A, SBC-16B.

During the 4th quarter, all the required springs were monitored in the month of October. However, three springs SBC-15, SBC-16 and SBC-16B were unnecessarily sampled for operational parameters when only field parameters were required. SBC-16A: reported no flow.

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**Streams**

YES ☒ NO ☐

Active stream samples required for quarterly operational monitoring include: BC-1, BC-2, BC-3, BC-4, CK-1, CK-2 and FC-1. No flow was reported during the 4<sup>th</sup> quarter for the following stream samples: FC-1 Lower Left Fork of Fish Creek at Property Line, BC-3: Lower Right Fork of Bear Creek and BC-4: Upper Right Fork Bear Creek.

**UPDES**

YES ☒ NO ☐

Five stations are monitored for the Bear Canyon UPDES permit on a monthly basis. None of these stations reported any monthly flow data from the five stations during the 4th quarter of 2010 with the exception was discharge point UTG040006-004 - Mine Water to Bear Canyon Creek, which reported monthly discharges during the 4th quarter of 2010. Flow from this point averaged this quarter at 86 gpm and TDS concentrations averaged 1,411 mg/L. The Permittee appears to be having difficulty meeting their required TDS permit limits of 500 mg/L average over a 30 day period.

**Wells**

YES ☒ NO ☐

Three wells are monitored at the mine. SBC-3 (Creek Well) is monitored for operational parameters on a quarterly basis. MW-114 and MW-117 are gauged for depth to water level only during the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> quarters. All wells were monitored during this quarter.

**2. Were all required parameters reported for each site?**

**In-mine**

YES ☒ NO ☐

The TDS parameter for all in-mine locations is no longer sampled for per the revision to the groundwater Table (table 7-13) in the Bear Canyon water monitoring plan.

**Springs**

YES ☒ NO ☐

The TDS parameter for all spring locations is no longer sampled for per the revision to the groundwater Table (table 7-13) in the Bear Canyon water monitoring plan.

**Streams**

YES ☒ NO ☐

**UPDES**

YES ☐ NO ☒

No monthly grab sample data were reported for the month of December 2010.

### 3. Were any irregularities found in the data?

**In-mine**

YES ☐ NO ☒

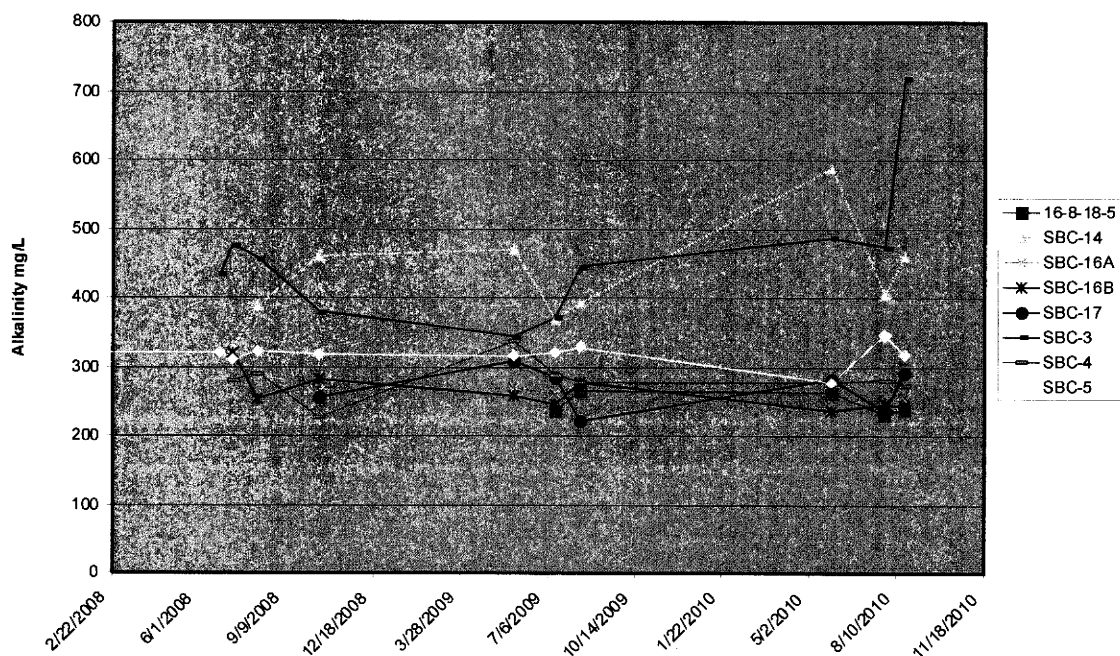
**Springs**

YES ☒ NO ☐

Conductivity rates were outside of two standard deviations in several stream samples. Conductivity was elevated in samples SBC-14, SBC-17, SBC-4, and lower than usual in SBC-15.

Third quarter 2010 data for alkalinity was elevated in SBC-14 at a concentration of 588 mg/L. The average concentration is 409 mg/L. Typically, at pH levels below 8.5, alkalinity is a direct measurement of bicarbonate concentrations in the water. Bicarbonate levels were not outside of normal ranges this quarter. SBC-3 known as the Creek Well but had for a long time been associated as a spring sample is also shown on this graph with upward trending concentrations of alkalinity jumped from 474 to 718 mg/L. Unfortunately, the Bear Canyon water monitoring plan was modified to exclude alkalinity and bicarbonate from operational sampling requirements, therefore no trends can be further monitored.

Alkalinity Levels in Selected Spring Samples



As can be seen in the chart above, alkalinity concentrations have shown a sharp increase in samples SBC-14 and SBC-3. Continued monitoring is recommended to see if an upward trend is observable.

# Streams

YES ☐ NO ☒

Dissolved oxygen rates from all the stream samples appeared to be higher than usual this quarter. Note the upward trend in DO readings on the table below. The Permittee indicated that these values were verified by what was written in the field notes. Rather than rely on information written in the field notes, the Permittee should verify that the meter used to measure dissolved oxygen is calibrated properly and being used in accordance with manufacturers instructions. Although dissolved oxygen is ideally measured in the field, the Permittee may want to consult the laboratory regarding if anomalous DO readings continue to be recorded in the field and request that the laboratory analyze for dissolved oxygen measurements.

SITE	SITE		Wat. Temp	F-pH	F-D.O.	Cond(FLD)
NAME	DESCRIPTION	DATE	Deg. C	pH units	mg/l	umhos/cm
CK-1	Lower Cedar Creek	10/19/2010	5.4	8.49	17.47	586
CK-1	Lower Cedar Creek	7/26/2010	19.9	8.75	9.1	617
CK-1	Lower Cedar Creek	6/23/2010	5.2	8.59	9.12	637
CK-2	Upper Cedar Creek	10/20/2010	6.39	8.32	11.51	1485
CK-2	Upper Cedar Creek	7/26/2010	22	8.54	9.15	849
CK-2	Upper Cedar Creek	6/23/2010	17.1	8.55	9.28	835
BC-2	Lower Bear Ck	10/21/2010	9.04	8.61	54.4	2262
BC-2	Lower Bear Ck	7/26/2010	19	8.72	11.38	1043
BC-2	Lower Bear Ck	6/23/2010	14.4	8.37	11.36	1371
BC-1	Upper Bear Ck	10/20/2010	11.83	8.45	25.4	1243
BC-1	Upper Bear Ck	7/26/2010	15	8.8	9.25	642
BC-1	Upper Bear Ck	6/23/2010	13	8.62	10.79	728

All stream samples for total dissolved solids detections during this quarter were well below the state water quality standards of 1,200 mg/L.

# UPDES

YES ☒ NO ☐

Mine water from Bear Canyon Creek at Outfall 004 was the only point that discharged this quarter. Mine water has been consistently discharging from this location since May 2009. TDS concentrations from this outfall location have consistently been above the permit limitations of 500 mg/L over the course of 4th quarter. In addition, TSS was exceeded on November 23, 2010. It does not appear that a monthly grab sample was collected for a full suite of the required parameters in the month of December 2010.

**Wells**

YES ☐ NO ☒

**4. On what date does the MRP require a five-year resampling of baseline water data.**

Baseline parameters are to be taken in August of year 5 prior to each permit renewal. The parameters are referred to as the "Expanded List" in Tables 7-13 and 7-17 of the MRP. Permit renewal date was November 02, 2010.

**5. Based on your review, what further actions, if any, do you recommend?**

○ Sample BC-3 at the Lower Right Fork of Bear Creek appears to show a higher than normal increase in the levels of Total Dissolved Solids (TDS) since May 2008. This indicates that excess sediment may be discharging into the creek. The operator should evaluate sediment controls in this area and determine if there is any mitigation needed to control the level of sediment entering the water body. The location of stream sample BC-3 is an important one due to the fact that it is located adjacent to the main road. A high likelihood of this area receiving sediment from the disturbed area exists.

○ Alkalinity concentrations have shown a sharp increase in samples SBC-14 and SBC-3. Continued monitoring is recommended at these locations to see if an upward trend is observable.

**6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements?**

YES ☒ NO ☐

Determine if any grab samples were collected during the month of December 2010. *If that information is available, please forward it to the Division.*

**7. Follow-up from last quarter, if necessary.**

None. However, as a reminder, the Permittee has committed to reactivating water sampling locations in areas that will be planned for mining in the future. The Permittee is required to notify the Division if any mining is to resume/occur in the following areas: Leases U-46481; U-024316; T16N, R8E, Secs 7, 17,18,19,20; Mine #4; Mohrland area; or portal opening accessing Leases U61048 or U-61049. According to Table 7-50 in the Bear Canyon MRP, the Permittee will begin monitoring these locations 6 months prior to undermining in these areas.

**8. Did the Mine Operator submit all the missing and/or irregular data?**

YES ☐ NO ☒

TDS data was not collected from the springs or in mine sample locations. The Permittee notified the Division that this omission had occurred. According to Table 7-13 in the MRP, the recently revised groundwater sampling protocol does not call for TDS samples to be collected from any of the groundwater sampling locations.